

Runtime Assurance for Flight Test Research Aircraft, Phase I

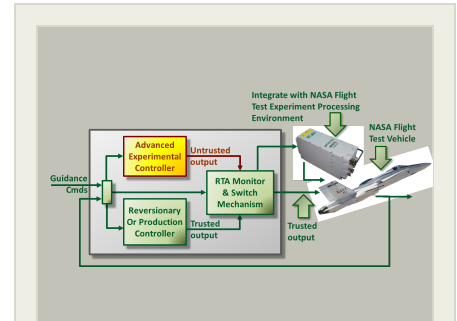
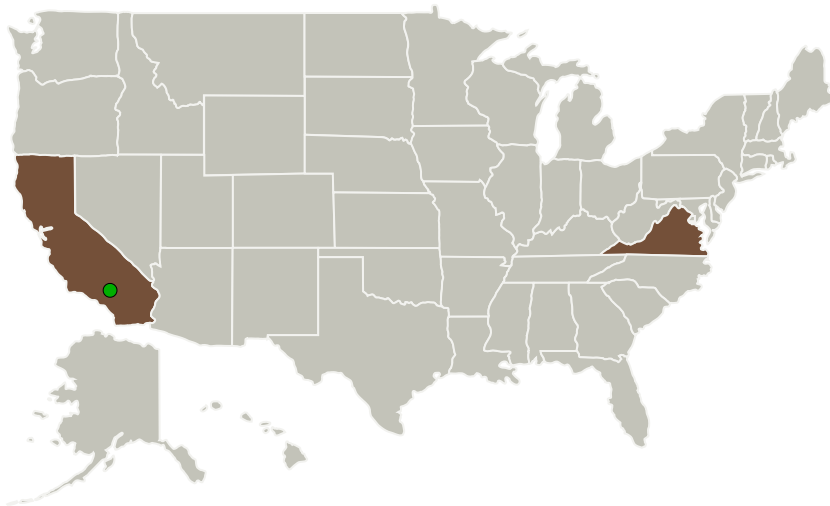
Completed Technology Project (2016 - 2016)



Project Introduction

Barron Associates proposes to develop a runtime assurance (RTA) system that provides in-flight protection to research aircraft that are flight testing advanced or experimental controllers. The RTA system monitors key critical parameters to determine if errors in the experimental controller are potentially driving the vehicle to unsafe flight conditions. If such conditions are ensuing, the RTA system activates mitigation strategies to bring the aircraft back to a safe state. The main efforts in Phase I are: (1) develop the RTA system in a desktop simulation environment using a challenge problem with a specific advanced control system applied to a specific flight test vehicle that is of interest to NASA Armstrong, (2) integrate the RTA system into a NASA flight test experiment processing environment, (3) generalize the RTA design approach, and (4) prepare for SUAS Phase II flight tests by designing a flight test article and flight test experiment plan. The unmanned, small scale Phase II flight test will lay the groundwork for larger scale Phase III flight test in manned aircraft at NASA or other test facilities.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Barron Associates, Inc.	Lead Organization	Industry	Charlottesville, Virginia
● Armstrong Flight Research Center (AFRC)	Supporting Organization	NASA Center	Edwards, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

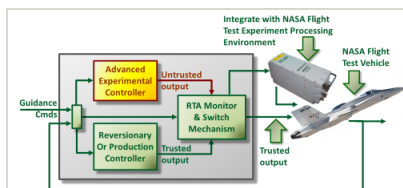
▶ **June 2016:** Project Start

✓ **December 2016:** Closed out

Closeout Documentation:

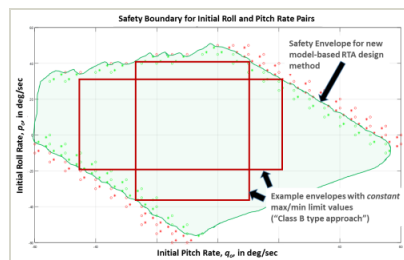
- Final Summary Chart(<https://techport.nasa.gov/file/139891>)

Images



Briefing Chart Image

Runtime Assurance for Flight Test Research Aircraft, Phase I
(<https://techport.nasa.gov/image/136858>)



Final Summary Chart Image

Runtime Assurance for Flight Test Research Aircraft, Phase I Project Image
(<https://techport.nasa.gov/image/135691>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Barron Associates, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

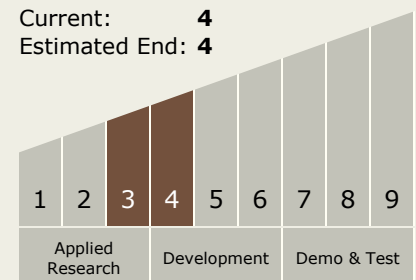
Carlos Torrez

Principal Investigator:

Richard Adams

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
 - └ TX11.1 Software Development, Engineering, and Integrity
 - └ TX11.1.4 Operational Assurance

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System